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Non-fatal overdose among adult prisoners with a history of injecting drug use in two Australian states

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ABSTRACT

Background: Recently released prisoners are at markedly increased risk of death and drug-related causes predominate. Non-fatal overdose (NFOD) is considerably more common than fatal overdose, but has received relatively little research attention and most studies of NFOD in this population have suffered from small samples of unknown representativeness. This study aimed to estimate the prevalence and correlates of lifetime NFOD among prisoners in NSW and Queensland.
Methods: Cross-sectional surveys of adult prisoners in two Australian states: New South Wales ($n = 972$) and Queensland ($n = 1316$). Use of similar measures and methods in the two states made direct comparison of findings possible.
Results: In both NSW and Queensland, 23% of participants reported a lifetime history of NFOD and prisoners with a history of injecting drug use were significantly more likely to report lifetime NFOD. The lifetime prevalence of NFOD among prisoners with a history of injecting drug use was significantly higher in NSW than in Queensland (44% vs. 35%; $p < 0.01$). Independent correlates of lifetime NFOD were similar across the two states and included ever attempting suicide, ever injecting heroin, and ever injecting opioids.
Conclusions: The risk of NFOD among prisoners with a history of injecting drug use is high. An understanding of the risk factors for NFOD in this population can inform targeted, evidence-based interventions to reduce this risk.

1. Introduction

Recently released prisoners are at markedly increased risk of preventable death, primarily due to drug overdose and suicide (Kinner et al., 2013a,b; Merrall et al., 2010; Zlodre and Fazel, 2012). For example, in a study of 48,771 sentenced prisoners in England and Wales, Farrell and Marsden (2008) found that in the first week after release from custody male prisoners were 29.4 times more likely to die, and women were 68.9 times more likely to die, than sex- and age-matched community peers. Over 95% of these deaths were attributed to drugs. Similarly, a large Australian study of 85,203 adults with a history of incarceration found that age- and sex-standardised mortality ratios were substantially elevated for drug-related deaths (Kariminia et al., 2007). Although a number of studies have examined drug-related death among ex-prisoners, the limitations associated with routinely collected data (e.g., administrative data contain few potential predictor variables, and a lack of detail on circumstances surrounding the death) mean that few risk factors have been identified, hampering efforts to inform preventive interventions (Kinner, 2010).

Community studies in Australia indicate that non-fatal overdose (NFOD) is considerably more common than fatal overdose (Darke et al., 2003) and is associated with substantial morbidity, particularly pressure injuries and pulmonary complications (Warner-Smith et al., 2002). Understanding who is most at risk

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of NFOD is important to inform efforts to prevent both non-fatal (Darke, 2008) and fatal overdose in high risk groups such as ex-prisoners, yet NFOD has received relatively little research attention (Strang, 2002).

A number of studies have identified a history of recent incarceration as a risk factor for NFOD in community recruited cohorts (Kerr et al., 2007; Seal et al., 2001; Yin et al., 2007), however few have examined NFOD among prisoners or ex-prisoners. Thus, despite calls from the World Health Organisation (WHO, 2010) and others to provide evidence-based support for those at greatest risk of drug-related harm after release from prison, it remains unclear who among this already at-risk population is most likely to experience an overdose post-release (Kinner et al., 2012). Given evidence that the experience of NFOD is associated with an increased risk of subsequent non-fatal and fatal overdose (Coffin et al., 2007; Darke et al., 2011; Kinner et al., 2012; Stoove et al., 2009), understanding who is most at risk of another overdose (non-fatal or fatal) after release from custody can assist in targeting preventive interventions.

Among people who inject drugs, studies in community settings have identified a number of risk factors for NFOD including homelessness, a history of multiple arrests and/or imprisonments, longer time in prison, binge drug use and/or higher frequency of injecting, street injecting, longer history of opiate use, and polysubstance use (Coffin et al., 2007; Seal et al., 2001; Sergeev et al., 2003; Yin et al., 2007). Older age and enrolment in methadone maintenance treatment seem to be protective (Coffin et al., 2007; Kerr et al., 2007; Seal et al., 2001). Others have found that the risk of NFOD is compounded by poor mental health, particularly depression and suicidal behaviour (Rossow and Lauritzen, 1999; Tobin and Latkin, 2003). While the evidence is not as strong, it has been argued that systemic disease, particularly smoking-related lung disease and liver dysfunction associated with hepatitis C, may also increase the risk of overdose (Warner-Smith et al., 2001). A recent longitudinal study of 2,515 community-recruited illicit drug users in Vancouver (Kinner et al., 2012) found that while recent incarceration was associated with more than twice the odds of NFOD, other risk factors for NFOD in recently released prisoners were similar to those for illicit drug users who had not been incarcerated recently. Irrespective of recent incarceration, independent risk factors for NFOD included daily use of heroin, benzodiazepines, cocaine or methamphetamine; binge drug use; public injecting; and previous NFOD.

Many studies of NFOD have suffered from small samples of unknown representativeness, limiting the generalisability of the findings. Given jurisdictional differences in drug markets, structural factors and cultural context, it is unclear whether the findings from one setting can be applied to others. Using data from two large samples of prisoners in Australia (New South Wales and Queensland), the aims of this study were to (1) estimate the prevalence of lifetime NFOD in adult prisoners and in those with a lifetime history of injecting drug use (IDU), (2) identify independent correlates of NFOD in prisoners with a history of IDU, and (3) compare the prevalence and correlates of NFOD among prisoners in New South Wales and Queensland.

2. Methods

Data for the present study come from cross-sectional surveys of adult prisoners in two Australian states: New South Wales (NSW) and Queensland. NSW and Queensland account for 52% of the total Australian resident population (ABS, 2012a) and 52% of the total daily prisoner population ($N = 29,383$) (ABS, 2012b).

2.1. NSW sample

The *2009 NSW Inmate Health Survey* included a stratified random sample of prisoners across 30 NSW adult correctional centres (26 male and 4 female centres) interviewed between May 2008 and March 2009. The sample was stratified by age group (18–24, 25–44, 45+ years), gender (women were over-sampled) and aboriginality. Exclusion criteria included: insufficient English and/or having an intellectual disability or mental health disorder which prevented informed consent. The survey was conducted using computer assisted telephone interviewing, which is a survey technique using programed software to provide a script for the interviewer, with the data entered directly into a secure database. Participants were, however, invited to participate face-to-face by a research nurse who provided them with a full explanation of the project and conditions of informed consent (i.e., participation voluntary, no obligation to answer any questions deemed intrusive, withdrawal of consent possible at any time, names not recorded on any survey materials). Participants were compared with the total prisoner population (i.e., the cohort obtained at the start of the survey for the random sample estimates) and were found to be representative (Indig et al., 2010). Participants were blood-tested for hepatitis C exposure and completed a detailed questionnaire covering a broad range of physical and mental health topics. Interviews took on average 73 min to complete. Ethics approvals for the study were obtained from the NSW Justice Health Human Research and Ethics Committee, the NSW Department of Corrective Services Ethics Committee and the Aboriginal Health and Medical Research Council ethics committee. More information about the study methods is available elsewhere (Indig et al., 2010).

2.2. Queensland sample

The Passports study was a single-blinded randomised controlled trial of a re-entry intervention for sentenced adult prisoners in Queensland, Australia. Baseline interviews were conducted within six weeks of expected release from custody and before randomisation, in two female and five male prisons between August 2008 and July 2010. Potentially eligible prisoners were identified from prison records. Those on remand (pre-trial detainees) were excluded due to uncertainty regarding release, and women were oversampled to ensure sufficient numbers for sex-stratified analyses. Eligibility criteria included (1) expected release within the next 6 weeks, (2) not on remand, and (3) able to provide informed, written consent. Participants were compared with all potentially eligible participants who did not participate. The sample was reasonably representative of all prisoner releases state-wide, except that women were intentionally over-sampled.

Data were collected via face-to-face administration of a structured questionnaire by trained researchers. Potentially eligible participants met with researchers in a private room in the prison health or education centre. Researchers explained the study in plain language and provided a written, plain-language information sheet. Potential participants were screened for eligibility and those eligible were invited to participate and sign a consent form. Interviews typically took 60–90 min to complete. Participants' hepatitis C exposure status was obtained from correctional health records where available. Ethics approval for the study was provided by The University of Queensland's Behavioural and Social Sciences Ethical Review Committee. The study design is described in more detail elsewhere (Kinner et al., Under review).

2.3. Measures

The questionnaires used in the Passports study and the 2009 NSW Inmate Health Survey were both based on the 2001 NSW Inmate Health Survey (Butler and Milner, 2003) such that many of the measures used in the two studies were identical.

2.3.1. Non-fatal overdose. Participants in both samples were asked if they had 'ever overdosed or become unconscious as a result of taking drugs'. In addition, participants reported the number of lifetime NFODs they had experienced and indicated where they had occurred (in prison, in the community, or both).

2.3.2. Potential correlates for NFOD. Age was dichotomised into <30 years versus 30+ years, consistent with evidence that the average age of fatal overdose in Australia is 30 years (Warner-Smith et al., 2001). Other socio-demographic variables included education (<10 years vs. 10+ years of schooling), Indigenous status (yes/no), employed in the six months before incarceration (yes/no), and homelessness defined as living in unsettled lodgings or sleeping on the streets immediately before coming into prison (yes/no).

Participants were asked if they had ever spent time in juvenile detention, and how many times they had been in adult prison (including their current incarceration; <3 vs. 3+ times).

Exposure to hepatitis C was determined via a blood test in NSW, and by review of correctional health records in Queensland (where available). Twenty-seven percent ($n = 273$) of the NSW sample and 45% ($n = 590$) of the Queensland sample were either not tested for hepatitis C or the results of the test were unavailable. Hepatitis C testing in Queensland is presumptive (i.e., persons who are judged as being at risk are tested) which may partly explain the larger proportion of records coded as 'unknown' compared to NSW. So that these participants were not excluded from analyses, the hepatitis C exposure variable was coded as positive, negative or unknown. Participants were asked whether they had ever been told by a doctor that they had a mental illness (yes/no); and whether they had ever attempted suicide (distinct from self-harming behaviours; yes/no).

Participants were asked whether they were a current tobacco smoker, and whether they had used cannabis regularly (daily or almost daily) prior to entering custody (assessed as 12 months prior to custody in NSW; 3 months prior to custody in Queensland). Alcohol consumption in the year before prison was assessed using the Alcohol Use Disorders Identification Test (AUDIT), with a score of 8 or more indicative of risky drinking (Babor et al., 2001). Participants were